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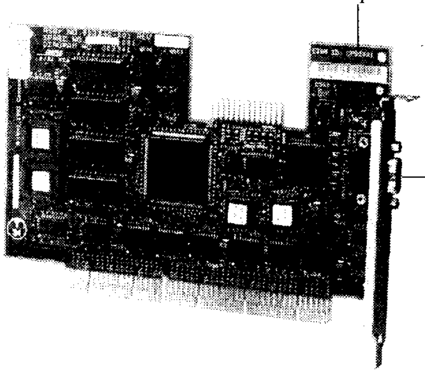


*Adapter.*

**adaptive delta pulse code modulation** Abbreviated ADPCM. A class of compression encoding and decoding algorithms used in audio compression and other data-compression applications. ADPCM stores digitally sampled signals as a series of changes in value, adapting the range of the change with each sample as needed, thus increasing the effective bit resolution of the data. *See also* pulse code modulation.

**adaptive differential pulse code modulation** A digital audio compression algorithm that stores samples as the difference between a linear combination of previous samples and the actual sample, thus effectively reducing the dynamic range of the audio waveform. The linear combination formula is modified every few samples to minimize the dynamic range of the output signal, resulting in efficient storage. *See also* pulse code modulation.

**adaptive system** A system that is capable of altering its behavior based upon certain aspects of its experience or environment. *See also* expert system.

**ADC** *See* analog-to-digital converter.

**A-D converter** *See* analog-to-digital converter.

**adder** A unit within a central processing unit (CPU) that sums two numbers sent to it by processor instructions; any circuit that adds binary values. Also, a circuit or integrated circuit that sums the amplitude of two input signals. *See also* full adder, half adder.

**addition record** A file that describes new record entries (such as a new customer, employee, or product) to a database so that they can later be scrutinized and posted. Also, a record in a change file specifying a new entry. *See also* change file.

**add-on** A device, such as an expansion card or an external hard disk, that is added to a computer to enhance or increase its capabilities. *See also* open architecture.

**address** As a noun, the value that represents an individually accessible storage location. In a typical computer, each memory location has a separate address. The addresses for the memory system are numbered 0, 1, 2, and so on, up to the maximum possible number of locations supported. Some addresses, having no associated storage in the form of RAM, correspond to input or output ports so that data can be read from or written to only those locations.

As a verb, to reference a storage location. *See also* address space, physical address, virtual address.

**addressable cursor** A cursor that can be moved to any location on the screen, as opposed to being restricted to sequential positions on the same or successive lines of the display. Most application programs use an addressable cursor. Software routines define the cursor's freedom of movement; the user employs the keyboard or some other input device to indicate where the cursor is to go. *Compare* mouse, pointer.

**address bus** A hardware pathway, typically consisting of from 20 to 64 separate lines, that carries the signals specifying locations in a computer's memory. The address bus enables the microprocessor to select a specific location in memory for transfer of data via the data bus. The size of (number of lines in) the address bus is directly related to the number of locations a microprocessor can address—essentially, the amount of memory it can use for programs and data. *See also* bus.

**address decoder** An electronic device that converts a numeric address to the selection of a memory location on one or more RAM (random access memory) chips. *See also* RAM.

monitor, the electron beam rhythmically sweeps across and down the screen, "painting" an image as it moves. The beam moves in a precisely synchronized pattern from left to right and top to bottom. At the right edge of each line, the display signal is turned off while the beam returns to the left to begin a new line. The return is called the horizontal retrace, and the very brief pause during this repositioning is called the horizontal blanking interval. Similarly, at the bottom right corner of the display, the signal is turned off while the electron beam moves to the top left corner. This change in position is called the vertical retrace, and the associated pause is the vertical blanking interval. Blanking is necessary to avoid marking the screen (and corrupting the displayed image) with the retrace paths followed by the electron beam.

**blast** *See* burn.

**bleed** In a printed document, any element that runs off the edge of the page or into the gutter. Bleeds are often used in books, for example, to mark important pages so they are easier to find.

**blind search** A search for data in memory or on a storage device with no foreknowledge as to the data's order or location. *Compare* binary search, indexed search; *see also* linear search.

**blinking** The flashing on and off of a displayed character or image on a computer screen. Blinking is typical of cursors, insertion points, menu choices, warning messages, and other displays that are meant to catch the eye. Some blinking, such as the "blink rate" of the insertion point on the Macintosh, can be controlled by the user.

**blip** A small, optically sensed mark on a recording medium, such as microfilm, that is used for counting or other tracking purposes.

**block** Literally, a group of similar things—usually bytes of storage or data, or segments of text. The word *block* is used in many contexts, so its exact definition varies with the type of item referenced. In programming, a block is a section of random access memory temporarily assigned (allocated) to a program by the operating system or a group of statements in a program that are treated as a unit.

In communications, a block is a unit of transmitted information consisting of identification codes, data, and error-checking codes.

In disk storage, a block is a collection of consecutive bytes of data that are read from or written to the disk as a group.

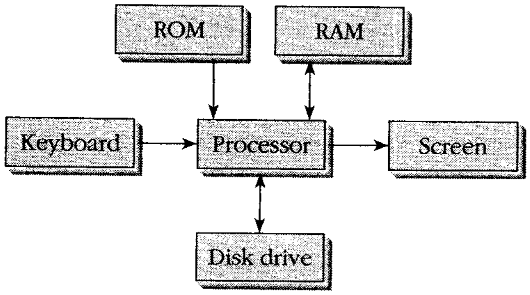
In video, a block is a rectangular grid of pixels that are handled as a unit.

In applications, a block is a segment of text that can be selected and acted upon as a whole.

**block cursor** An on-screen cursor that has the same width and height, in pixels, as a text-mode character cell. A block cursor is used in text-based applications, especially as the mouse pointer when a mouse is installed in the system. *See also* character cell, cursor, mouse pointer.

**block device** A device, such as a disk drive, that moves information in blocks—groups of bytes—rather than one character (byte) at a time. *Compare* character device.

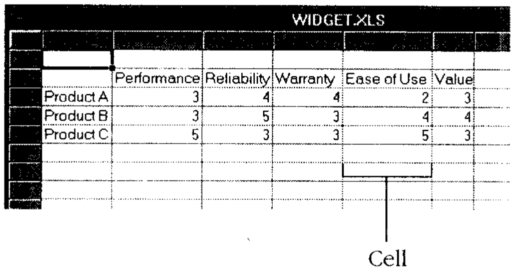
**block diagram** A chart of a computer or other system in which labeled blocks are used to represent the components, and lines and arrows show the pathways and relationships among the elements. See the illustration. A block diagram is an overall schematic that shows what a system consists of and how it works. A flowchart shows the operational specifics of such a system in more detail. *Compare* flowchart.



***Block diagram.***

**block gap** Also called interblock gap, or IBG. In tape storage, a physical region, typically extending for a fraction of an inch, that separates blocks of data or physical records. In disk storage, the unused space between formatted sectors.

**cell** In spreadsheet terminology, the intersection of a row and a column. Each row and column in a spreadsheet is unique, so each cell can be uniquely identified—for example, cell B17, at the intersection of column B and row 17. Each cell is displayed as a rectangular space that can hold text, a value, or a formula. See the illustration. Similarly, although less familiarly, a cell is an addressable (named or numbered) storage unit for information. A binary cell, for example, is a storage unit that can hold 1 bit of information—that is, it can be either on or off.



***Cell.***

**cellular automata** In computer science, theoretical models of parallel computers. They enable the investigation of parallel computers without the need to actually build them. The cellular automaton is composed of a network of multiple cells, each representing a processor in the parallel computer. The cells must be identical, and they must have a finite amount of available memory. Each cell outputs a value calculated from the input values it receives from its neighboring cells, and all cells output their values simultaneously.

**center** To align characters around a point located in the middle of a line, page, or other defined area; in effect, to place text an equal distance from each margin or border. *See also* align.

**centi-** Prefix meaning "one hundred" or, more usually, "one hundredth," as in *centimeter*—one hundredth of a meter.

**centralized processing** The location of computer processing facilities and operations in a single (centralized) place. *Compare* decentralized processing, distributed processing.

**central office** In communications, the switching center where interconnections between customers' communications lines are made.

**central processing unit** Abbreviated CPU. The computational and control unit of a computer; the device that interprets and executes instructions. Mainframes and early minicomputers contained circuit boards full of integrated circuits that implemented the central processing unit. Single-chip central processing units, called microprocessors, made possible personal computers and workstations. Examples of single-chip CPUs are the Motorola 68000, 68020, and 68030 chips and the Intel 8080, 8086, 80286, 80386, and i486 chips. The CPU—or microprocessor, in the case of a microcomputer—has the ability to fetch, decode, and execute instructions and to transfer information to and from other resources over the computer's main data-transfer path, the bus. By definition, the CPU is the chip that functions as the "brain" of a computer. In some instances, however, the term encompasses both the processor and the computer's memory or, even more broadly, the main computer console (as opposed to peripheral equipment). *See also* microprocessor.

**Centronics parallel interface** A de facto standard for parallel data exchange paths between computers and peripherals, originally developed by the printer manufacturer Centronics, Inc. The Centronics parallel interface provides eight parallel data lines plus additional lines for control and status information.

**CGA** Acronym for Color/Graphics Adapter, a video adapter board introduced by IBM in 1981. The CGA is capable of several character and graphics modes, including character modes of 40 or 80 horizontal characters (columns) by 25 vertical lines with 16 colors, and graphics modes of 640 horizontal pixels by 200 vertical pixels with 2 colors, or 320 horizontal pixels by 200 vertical pixels with 4 colors. *See also* graphics adapter, video adapter.

**CGI** *See* Computer Graphics Interface.

**CGM** *See* Computer Graphics Metafile.

**chad** The paper removed when a hole is punched

**decay** A decrease in a signal's amplitude over time. For example, when an incandescent light bulb is turned off, the light decays over a few tenths of a second from full intensity to zero intensity.

**DECchip 21064** Also called the DEC Alpha or the DEC Alpha AXP. A Digital Equipment Corporation microprocessor introduced in February 1992. The DECchip 21064 is a 64-bit, RISC-based, superscalar, superpipelined microprocessor chip with 64-bit registers, a 64-bit data bus, a 64-bit address bus, and a 128-bit data path between the microprocessor and memory. In addition, the DECchip 21064 has a built-in 8-KB instruction cache, a built-in 8-KB data cache, and a floating-point processor. The DECchip 21064 contains 1.7 million transistors and operates at 3.3 volts. Originally introduced in a 150-MHz version running at a peak rate of 300 MIPS, the DECchip 21064 is also available in a 200-MHz version running at a peak rate of 400 MIPS. The DECchip 21064's architecture is SMP-compliant, which means that several DECchip 21064s can be used in a parallel (multiprocessor) configuration. *See also* floating-point processor, MIPS, pipelining, RISC, superpipelining, superscalar.

**deceleration time** The time required for an access arm to slow down as it approaches the desired portion of a disk. Access arms have weight, so the faster they move, the more momentum they gain. As a result, they cannot stop instantly.

**decentralized processing** The distribution of computer-processing facilities and operations in more than one location. Decentralized processing, although it shares out portions of the overall workload among several stations, is one of the primary differences between the mainframe and the microcomputer approaches to data management. Decentralized processing is not the same as distributed processing, which seeks to apply two or more computers to the same task in such a way that they can work cooperatively and more efficiently. *Compare* centralized processing, distributed processing.

**decibel** Abbreviated dB. One tenth of a bel (after Alexander Graham Bell); a unit of relative measurement commonly used in electronics and other fields. Measurements in decibels fall on a logarithmic scale, and they always compare the measured quantity against a known reference. The following formula is used to find the number of decibels between two values:

$$dB = n \log (x/r)$$

where $x$ is the measured quantity, $r$ is the reference quantity, and $n$ is 10 for voltage and current measurements and 20 for power measurements. A negative decibel value means that the measured quantity is less than the reference quantity. The dynamic range of an audio compact disc is about 90 dB, meaning that the maximum level of the music is 90 dB higher than the background noise level. The dynamic range of an audio cassette is typically 60 dB.

**decimal** The base-10 numbering system. *See also* base.

**decision** The selection of one among two or more possible courses of action. Decisions are sometimes mapped out in the form of decision tables or decision trees. The former are row-and-column layouts that outline specific conditions and the possible actions or outcomes related to each. The latter are tree-structured outlines in which nodes representing decision points branch into more and more specific alternative outcomes until they reach an end point (a leaf) that is the result of all the prior decisions made.

**decision box** A diamond-shaped flowchart symbol used to indicate a choice (decision) that results in branching in the process being illustrated. See the illustration on the next page.

**decision support system** Abbreviated DSS. A set of related programs and the data required to help with analysis and decision making within an organization. A DSS is similar to a management information system (MIS) or an executive information system (EIS) but provides the user with more help in formulating alternative decisions and choosing the most appropriate course. A DSS includes a database of information, a body of knowledge about the area in which decisions are to be made, a "language" that can be used to state video adapters that translates the digital representation of a pixel into the analog information needed by the monitor to display it. The presence of a RAMDAC chip generally enhances overall video performance.

**RAM disk** A simulated disk drive whose data is actually stored in RAM memory. A special program fools the operating system into believing that an additional disk drive is present. The operating system reads and writes to the simulated device, and the program stores and retrieves data from memory. RAM disks are extremely fast, but they require that system memory be given up for their use. Also, RAM disks usually use volatile memory, so the data stored on them disappears when power is turned off. Many portables offer RAM disks that use battery-backed CMOS RAM to avoid this problem. *Compare* disk cache; *see also* CMOS RAM.

**RAM refresh** *See* refresh.

**RAM-resident program** *See* terminate-and-stay-resident program.

**random access** Also called direct access. The ability of a computer to find and go directly to a particular storage location without having to search sequentially from the beginning location. With microcomputers, the term is often encountered in reference to a computer's memory, in which certain general locations are reserved for different types of information (applications, operating system, and so on) but specific items can be located directly through the use of numbers (addresses) that identify individual locations in memory. The term is also used to describe access to files stored on disk. This type of access is best used for files in which each set of information has no intrinsic relationship to what comes before or after it, such as in databases of client records, inventories, and so on. The human equivalent of random access would be the ability to find a desired address in an address book without having to proceed sequentially through all the addresses. *Compare* indexed sequential access method, sequential access.

**random access memory** *See* RAM.

**random noise** A signal in which there is no relationship between amplitude and time and in which many frequencies occur randomly, without pattern or predictability.

**random number generation** The creation of a number or sequence of numbers characterized by unpredictability so that no number is any more likely to occur at a given time or place in the sequence than any other. Because truly random number generation is generally viewed as impossible, the process would be more properly called "pseudorandom number generation."

**range** In a spreadsheet, a block of cells selected for similar treatment. A range of cells can extend across a row, down a column, or over a combination of the two, but all cells in the range must be contiguous, sharing at least one common border. Ranges allow the user to affect many cells with a single command—for example, to format them similarly, enter the same data into all of them, give them a name in common and treat them as a unit, or select and incorporate them into a formula.

In more general usage, *range* refers to the spread between specified low and high values. Range checking is an important method of validating data entered into an application.

**raster** A rectangular pattern of lines; on a video display, the horizontal scan lines from which the term *raster scan* is derived.

**raster display** A video monitor (generally a CRT) that displays an image on the screen from top to bottom as a series of horizontal scan lines. The scan lines are as wide as the smallest visible image on the screen. Within each scan line, individual pixels can be illuminated. Television screens and most computer monitors are raster displays. *Compare* vector display.

**raster graphics** A method of generating graphics in which images are stored as multitudes of small, independently controlled dots (pixels) arranged in rows and columns. Raster graphics treats an image as a collection of such dots. *Compare* vector graphics.

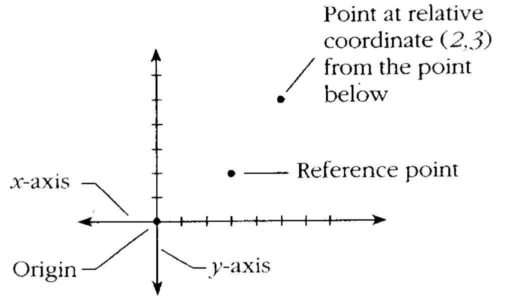
**raster image** A display image formed by patterns of light and dark pixels in a rectangular array. *See also* raster graphics.

**relational operator** An operator that allows the programmer to compare two (or more) values or expressions. Typical relational operators are greater than (>), equal to (=), less than (<), not equal to (<>), greater than or equal to (>=), and less than or equal to (<=). *See also* relational expression.

**relational structure** The record (tuple) organization used in the implementation of a relational model.

**relative address** Also called an indirect address. A location, as in a computer's memory, that is calculated in terms of its distance (displacement) from a starting point (base address). A relative address is typically computed by adding an offset to the base—in everyday terms, this is similar to creating the address 2001 Main Street, in which the base is the 2000 block of Main Street and the offset is 1, which specifies the first house from the beginning of the block.

**relative coordinates** Coordinates that are defined in terms of their distance from a given starting point, rather than from the origin (intersection of two axes) as are absolute coordinates. See the illustration. For example, from a starting point on the screen, a square defined by relative coordinates can be drawn as a series of lines, each representing a displacement in distance and direction from the end of the preceding point. The entire square can be redrawn at another location simply by changing the coordinates of the starting point rather than by recalculating the coordinates of each corner with reference to the origin. *Compare* absolute coordinates.



***Relative coordinates.***

**relative movement** Motion whose distance and direction are relative to the starting point. For example, when a mouse pointer is moved on the screen, the coordinates of its new position are relative to the previous location of the pointer. In computer graphics and cinematography, *relative movement* can also refer to the movement of one object in relation to another, such as the movement of horse A from the perspective of horse B on a racetrack. *See also* relative coordinates.

**relative pointing device** A cursor-control device, such as a mouse or a trackball, in which the movement of an on-screen cursor is linked to the movement of the device but not to the position of the device. For example, if a user picks up a mouse and puts it down in a different location on a desk, the position of the on-screen cursor does not change because no movement (rolling) is detected. When the user rolls the mouse again, the cursor moves to reflect the mouse movement against the surface of the desk. Relative pointing devices differ from absolute pointing devices, such as graphics tablets, in which the device's location within a defined area is always associated with a predefined on-screen position. *Compare* absolute pointing device; *see also* relative coordinates, relative movement.

**relay** A switch activated by an electrical signal. A relay allows another signal to be controlled without the need to route the other signal to the control point, and it also allows a relatively low-power signal—the signal used to activate the relay—to control a high-power signal.

**release** As a noun, a particular version of a piece of software, most commonly associated with the most recent version (as in "the latest release"). Some companies—for example, Lotus Development Corporation—use the term *release* as an integral part of the product name (as in *Lotus 1-2-3 Release 2.2*).

As a verb, for an application to relinquish control of a block of memory, a device, or another system resource, thereby "releasing" it to the operating system.

**reliability** The likelihood of a computer system or device continuing to function over a given